CLAIMS

1. A method of making sheet material of a magnesium containing aluminum alloy for sheet metal forming, said method comprising:

continuously casting a composition consisting essentially, by weight, of 3.5 to 5.5% magnesium, 0.4 to 1.6% manganese, 0 to 0.5% chromium, 0.2 to 2.0% copper and aluminum to form a cast slab with an as-cast gage of about 5 to 35 millimeters;

hot rolling said cast slab through at least one hot roller stand to form a hot rolled strip that emerges from said rolling at a temperature in the range of 200°C to 350°C and having experienced a thickness reduction from the cast slab of 30 to 80% with a rolled strip thickness of about 3 to 12 millimeters;

immediately coiling said hot rolled strip;

annealing the coiled strip at 450°C to 560°C for 3 to 30 hours to produce a microstructure comprising equi-axed grains with dispersed intermetallic particles; and

cold rolling said annealed strip through at least one cold rolling stage, without intermediate anneal, to effect a reduction of at least 50% in the thickness of the hot rolled strip and to yield said sheet material.

2. The method as recited in claim 1 in which said composition contains 4.5 to 5% magnesium.

3. The method as recited in claim 1 in which said composition contains 0.5 to 1% manganese.

4. The method as recited in claim 1 in which said composition contains 0.5 to 1% copper.

5. The method as recited in claim 1 in which said hot rolled strip emerges from said rolling at a temperature in the range of 230°C to 330°C.

6. The method as recited in claim 1 comprising annealing said coiled strip at 500°C to 550°C for 5 to 15 hours.

7. The method as recited in claim 1 comprising cold rolling said annealed strip to effect a reduction of 50 to 90% in the thickness of said hot rolled strip and to form a said sheet material less than 4 millimeters in thickness.

8. The method as recited in claim 1 further comprising heating said cold rolled sheet material to recrystallize it to a microstructure characterized by grains no larger than about 10 micrometers.

9. The method as recited in claim 1 where said recrystallized sheet material has an elongation of at least 300% in tensile test at 500° C and a strain rate of $10^{-3}s^{-1}$.

10. A method of making sheet material of an aluminum alloy for sheet metal forming, said method comprising:

continuously casting a composition consisting essentially, by weight, of 4.5 to 5.5% magnesium, 0.5 to 1.0% manganese, 0.05 to 0.3% chromium, 0.5 to 1.% copper, 0 to 0.2% zirconium, and aluminum to form cast slab with an as-cast gage of about 6 to 30 millimeters;

hot rolling said cast slab through at least one hot roller stand to form a hot rolled and hot worked strip that emerges from said rolling at a temperature in the range of 230°C to 330°C and having experienced a thickness reduction from the cast slab of 30 to 80% with a rolled strip thickness of about 3 to 12 millimeters;

immediately coiling said hot rolled strip;

annealing the coiled strip at 500°C to 550°C for 5 to 15 hours to produce a microstructure comprising equi-axed grains with dispersed intermetallic particles; and

cold rolling said annealed strip through at least one cold rolling stage, without intermediate anneal, to effect a reduction of at least 50% in the thickness of the hot rolled strip and to yield said sheet material.

11. The method as recited in claim 10 further comprising heating said cold rolled sheet material to recrystallize it to a microstructure characterized by grains no larger than about 10 micrometers.

12. The method as recited in claim 10 where said recrystallized sheet material has an elongation of at least 300% in tensile test at 500°C and a strain rate of $10^{-3}s^{-1}$.